



# The Lab Report

VOLUME I NO. I



WINTER 2015

WEST VIRGINIA  
STATE POLICE  
FORENSIC  
LABORATORY

## SPECIAL POINTS OF INTEREST:

- ISO 17025 Accreditation
- Postage Notice
- Introduction to each section of the laboratory
- How to contact us

## INSIDE:

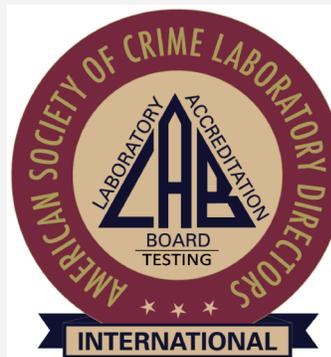
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## ISO 17025 ACCREDITATION

**Sheri Lemons**  
**Acting Laboratory Director /**  
**Quality Assurance Manager**

The West Virginia State Police Forensic Laboratory (WVSPFL) recently achieved International Accreditation. On November 14, 2014, the American Society of Crime Laboratory Directors/ Laboratory Accreditation Board (ASCLD/LAB) awarded ASCLD/LAB-*International* Accreditation to the laboratory - a culmination of over two years of hard work and dedication by the almost 50 laboratory analysts and support staff. This accreditation re-

quires conformance to almost 400 international standards



**Certificate Number: ALI-365-T**

for every type of forensic testing provided by the WVSPFL including Latent

Prints, DNA Analysis/ Serology, Questioned Documents, Toxicology, Trace Evidence, Drug Identification, and Firearm/Toolmark Analysis. ASCLD/LAB will visit the laboratory each year to ensure continuing compliance. This achievement is just one example of the dedication of WVSPFL to providing quality forensic services to law enforcement, officers of the court and ultimately the citizens of West Virginia.

## EVIDENCE DELIVERY: POSTAGE

Please ensure your evidence has sufficient postage for delivery to the laboratory. Evidence could be returned to the agency by the postal service if postage is insufficient, potentially compromising timely analysis and

the integrity of the evidentiary material.



# CENTRAL EVIDENCE RECEIVING

**David Miller**  
**Central Evidence Receiving and Processing**  
**Section Supervisor**

The Central Evidence Receiving (CER) Section of the laboratory receives all items of physical evidence that are submitted by law enforcement agencies throughout West Virginia. In 2014, CER received over 5,700 individual case submissions, many of which contained multiple items for analysis in multiple sections. All items were received, documented, internally routed, and returned by a 3-person staff. Items are usually delivered to the lab via certified mail or dropped off at the evidence locker at the laboratory. All submitted items must be individually packaged and sealed.

Sealed packages may be placed together into one container. To help submissions move through the lab quicker, officers should package items together according to the requested analysis. For example, all

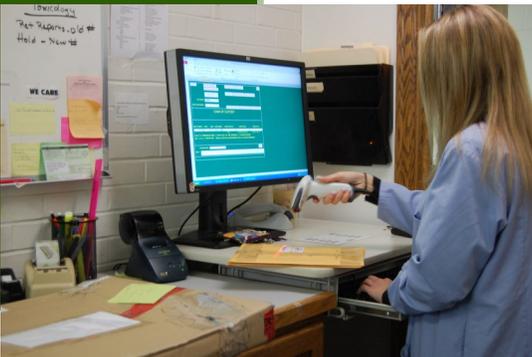
items going to Latent Prints in one container, and all items going to Processing (examination for biological material) in another con-

tainer. Outer containers should be labeled with the agency case number and a list of the contents.

Each case must be accompanied by a fully completed WVSP Form 53. Once received, the CER staff will use the WVSP Form 53 to enter your case information into our current Laboratory Information Management System (LIMS). It is important that the form be legible and complete, with each submitted item being listed along with its specific request for analysis. Supplemental submission forms must contain the same victim, suspect, and agency case number listed as on the original submission form. In the future, the laboratory will be implementing a new LIMS, in which submitting officers will complete case submission forms on-line. Information regarding the Forensic Advantage Laboratory Information Management System (FA-LIMS) should be disseminated to all law enforcement agencies in West Virginia sometime in 2015.



***“Each case must be accompanied by a fully completed WVSP Form 53.”***



# CENTRAL EVIDENCE PROCESSING

The Central Evidence Processing (CEP) Section of the laboratory examines items of physical evidence for biological material suitable for the type of DNA analysis performed in our laboratory. In 2014, CEP received 600 case submissions, and completed processing on 600 cases with a staff of five scientists. We will begin 2015 with a staff of four, and expect our case backlog to grow.

The CEP Section performs presumptive tests, which are screening tests that indicate a specific body fluid may be present, for blood and seminal fluid. We also perform confirmatory tests for human blood, semen, and saliva. When

blood, semen, saliva, hairs, or other body fluids are present or indicated, cuttings or swabs are collected and forwarded to the Biochemistry Section for PCR-based DNA analysis. A report is gener-

***“The Biochemistry Section must ensure that all of the needed known specimens, permission to consume evidence, or other documentation is present before they can begin testing”***

ated and provided to the investigator stating what information, documentation, or known specimen is needed to continue on with the DNA testing.

With advances in the DNA field, analysis may be attempted on a wider

variety of sample types than ever before, including

touched and handled items.

As investigating officers become aware of this, we see an increasing number of submissions coming into the laboratory, resulting in increased backlogs of untested cases. Unfortunately, not every case can be a priority; however, when there is a danger to the public, a pending trial date, or other documented circumstances, work may be taken out of order.

Otherwise, cases are worked in the order they are received at the laboratory.

The Biochemistry Section must ensure that all of the needed known specimens, permission to consume evidence, or other documentation is present before they



**Sample from a submitted swab taken for presumptive testing for seminal fluid.**

# CONT: CENTRAL EVIDENCE PROCESSING



**Evidence is processed before continuing to the Biochemistry Section.**

can begin testing. In many instances, investigating officers may not provide the requested information needed to continue the case or they may not provide notification that the DNA work is no longer needed. This places additional demands on the laboratories limited re-

sources. Beginning in 2015, the CEP Section will utilize an evidence coordinator to help manage the case flow going from the CEP Section to the Biochemistry Section. CEP Section laboratory reports will ask that investigating officers contact the laboratory within 30 days if they do intend to proceed with DNA analysis, given the results of the

preliminary testing. If contact is not made within 30 days, then the evidence and the questioned samples will be returned along with a letter stating what the laboratory needs to proceed with testing. The investigating officer may resubmit the questioned items at any time, along with the additional requested items. If contact is made within 30 days, the laboratory will retain the questioned items while waiting for the additional requested items.

## BIOCHEMISTRY

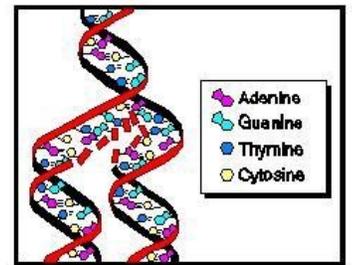
**Angela Gill  
Biochemistry Section  
Training Officer**

**What is DNA?** Deoxyribonucleic acid, or DNA, is a small, thread-like substance contained in almost every cell in the body. It is basically your “genetic blueprint” which codes for everything from your hair color to your blood type. Ap-

proximately 99% of DNA is the same between every human on the planet, leaving about 1% that is exclusive to each individual. Therefore, we know that with the exception of identical twins, no two humans will have the same DNA profile. The Biochemistry Section of the laboratory performs analysis on biological materials for the pres-

ence of DNA, concentrating on that small percentage that makes an individual unique.

In addition to performing analysis on casework samples, the Biochemistry Section is responsible for managing and administering the state’s Combined DNA Indexing System, or CODIS database.



**DNA Structure**

## CONT: BIOCHEMISTRY

On average, the Biochemistry Section receives approximately 500 cases a year, including sexual assaults, homicides, malicious wounding, robbery, and breaking and entering. After cases are screened by the laboratory's Processing Section, samples containing blood, seminal fluid, saliva, sweat, skin cells, hair, and touch DNA are forwarded to the Biochemistry Section for analysis. Through a variety of tests, analysts attempt to generate DNA profiles from evidentiary samples and compare them to the profiles of known individuals associated with each case. Currently, the Biochemistry Section uses the most up-to-date technologies (including robotic extraction, multi-locus amplification, and capillary electrophoresis) in order to obtain profiles and provide timely and accurate results. A DNA case takes about two weeks to complete, but this varies with number of samples, complexity of profiles generated, and the current backlog.

At this time, the Biochemistry Section is staffed by only six individuals, five analysts and one analyst in training. In 2015, the section is hoping to hire four additional analysts and technicians. Additionally, the section is looking to implement several new technologies and protocols in the coming year.

Some things to keep in mind when requesting DNA analysis:

- Make sure to wear the appropriate protective equipment (i.e. gloves, masks, coats, etc.) when collecting samples. DNA testing is extremely sensitive, and this will prevent contamination.
- Attempt to air dry samples before packaging them, and items should only be packaged in PAPER! This prevents mildewing of damp samples, which can inhibit DNA testing.
- Collect a sufficient amount of sample for testing. If there is only a small amount available, a consumption order is needed before testing can begin.
- Try to get known reference samples (i.e. blood and/or buccal swabs) from all individuals involved in the case. If a profile is generated from an evidence sample, the analyst will need a reference for comparison.
- Although many samples will be collected at a crime scene, the Biochemistry Section must limit the number of items that are tested. Providing a prioritized list of items will save time and prevent unnecessary and redundant testing. Typically eight to ten items will be tested, but exceptions can be made with varying circumstances (i.e. multiple suspects and/or victims, multiple crime scenes, etc.).

***“blood, seminal fluid, saliva, sweat, skin cells, hair, and touch DNA are forwarded to the Biochemistry Section for analysis”***

*“Currently, the Biochemistry Section uses the most up-to-date technologies in order to obtain profiles..”*

## CONT: BIOCHEMISTRY

- Very specific criteria must be met before a profile generated from an evidence sample can be entered into CODIS. Analysts cannot search the CODIS database for an individual’s profile. If you want to know if someone is in the database, a request must be submitted on letterhead.
- The Biochemistry Section does not conduct paternity testing at this time. Paternity cases will be referred to the Marshall University Forensic Science Center.
- Requests for DNA testing on skeletal remains or missing person cases are typically referred to the University of North Texas Health Science Center, Center for Human Identification.



**The inside of the 3130 Genetic Analyzer, used to separate DNA fragments.**

*The laboratory currently employs 37 examiners and technicians.*

## LABORATORY STAFF

As a brief introduction to the laboratory staff the following list provides a breakdown of the current laboratory staff. This list specifically shows the number of examiners and technicians, including how many work in each section and how many are trained.

Central Evidence Receiving — 3 employees (all trained)

Central Evidence Processing — 4 employees (all trained)

Biochemistry — 7 employees (5 Trained)

Drug Identification — 8 employees (7 trained)

Firearm/Toolmark — 4 employees (3 trained)

Latent Prints — 4 employees (all trained)

Questioned Documents — 1 employee (trained)

Toxicology — 3 employees (1 trained)

Trace Evidence — 3 employees (1 fully trained [all trained in GSR])

# DRUG IDENTIFICATION

Amanda Vane  
Drug Identification Section  
Forensic Analyst

**CONTROLLED SUBSTANCE** — a drug, substance, or immediate precursor in Schedules I through V of Article Two.

- West Virginia State Statute Chapter 60A, Section 60A1-101

<http://www.legis.state.wv.us/wvcode/Code.cfm?chap=60a&art=1>

The Drug Identification Section of the West Virginia State Police Forensic Laboratory is responsible for the analyses of controlled substances, precursor chemicals, and certain non-controlled substances used to manufacture controlled substances. These substances can usually be found in the form of powders, liquids, tablets, capsules, vegetable matter, and paraphernalia.

Most evidence is analyzed in a two-step process. First, the substance is subjected to a series of preliminary tests (i.e. color tests, microscopic examination, etc.). These tests give an indication of what the substance might be and suggest a path for further analysis. The second step is to confirm the identification of the substance. The Drug Section utilizes Gas Chromatography/Mass Spectrometry (GCMS) and Fourier Transform Infra-Red Spectrometry (FTIR) to confirm suspected controlled substances, non-controlled substances, as well as chemicals used in clandestine laboratories. Identification of suspected marijuana relies upon a series of tests. These tests, when used in combination, are considered a specific analysis to confirm the identification of marijuana.

Some Drug Section Facts for **2014**:

- The Drug Identification Section received 3,625 cases
- Over one-half of the cases received involved heroin
- 175 clandestine laboratories were submitted
- The Drug Identification Section received 573 letters for expedited testing from May to December

Nine things to note:

1. **Syringe cases:** The laboratory will not routinely accept or analyze syringe cases. However, if the case is involving a tampering of unused factory prepared samples, as from hospitals, the case will be evaluated and accepted if it proves to have merit.
2. **Poison cases:** Poison cases will not be accepted unless directly related to drugs (i.e., an obvious tablet in a soft drink).
3. **Consumer tampering cases:** Consumer tampering cases will not be accepted. They must be referred to the FDA or FBI.

## CONT: DRUG IDENTIFICATION



Marihuana

**The Drug Identification Section received 3,625 cases in 2014 — half of which involved heroin.**



Heroin

4. **Soil comparison and fertilizer content:** Soil comparison and fertilizer content cases will not be accepted. amount of another controlled substance in the case.
5. **Vegetation tests for nicotine:** Vegetation cases from correctional facilities will be analyzed for nicotine and reported as contains nicotine. This year, Carrie Ozalas, the Drug Section Supervisor, worked with the West Virginia State Legislators, both the House of Delegates and the Senate, on House Bill 4208. She helped improve the clarity of the current state code and facilitated the addition of synthetic cannabinoids and cathinones (bath salts). Language utilized for the addition of these ever-changing varieties of compounds was mirrored on surrounding state codes, in order to control synthetic cannabinoids and cathinones. H.B. 4208 was passed and made effective June 6<sup>th</sup>, 2014.
6. **Cocaine on currency:** Cocaine analysis will not be performed on currency unless a visible amount of residue is present.
7. **Large marihuana plants from fields or in pots:** Large marihuana plants from fields or in pots should not be submitted, just representative samples of them.
8. **Mixed samples (i.e. containing hairs, paper, etc.):** Evidence will not be manicured. For example, if hair is in the sample, it will not be removed before the weight is obtained. It should also be mentioned that we have been understaffed this year, losing two analysts. However, having newly trained analysts, we are looking forward to a productive 2015.
9. **Residual amounts of substances:** Residual amounts (in smoking devices, straws, razor blades, etc.) of substances will not be tested provided there is a measureable

**A GCMS used in the Drug Identification Section for analysis of specific controlled substances.**



# FIREARM/TOOLMARK IDENTIFICATION

## Calissa Carper Firearm/Toolmark Identification Training Officer

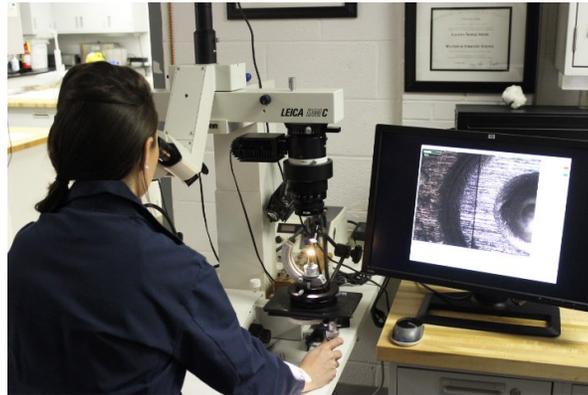
The Firearm/Toolmark Section examines every firearm, toolmark, footwear, and tire track related case submitted to the laboratory by all 55 counties in West Virginia. Our section is currently staffed with four employees – Kent Cochran is the Section Supervisor, Calissa Carper is the senior analyst, Blake Reta is the section’s newest analyst, and Ryan Christopher is currently in training. Due to backlogged cases, our current turnaround time is approximately 7 months.

While contrary to the popular misnomer of being the “Ballistics” Section, our scientific discipline is called Firearm and Toolmark Identification, which is concerned with determining whether a fired bullet, fired cartridge case, or other fired ammunition components were fired from a specific firearm. Ballistics is the study of a projectile in flight. The examinations performed in

the Firearm/Toolmark Section include but are not limited to:

### 1. **Firearm Examination/**

**Comparison:** Determine whether a fired bullet, fired cartridge case, fired shotshell or other fired ammunition components were fired from a specific firearm.



2. **Firearm Function Check:** Determine if the firearm functions as designed or not. Extensive function check examinations may include trigger pull measurements and impact testing if requested. Determination of short barreled shotguns and rifles will be performed for federal statutes.

### 3. **General Rifling Characteristics**

**Search:** Examine a fired bullet or

fired cartridge case to provide a FBI database generated list of possible firearms (make, model, and caliber/chambering) as an investigative lead.

4. **Ammunition Component Examination:** Determine if a loaded cartridge was cycled through a particular firearm. Determine if a fired ammunition component is similar to the submitted loaded ammunition.

5. **Distance Determination:** Determine the approximate distance from the muzzle of the firearm to the victim at the time of the shooting based on the microscopic and/or chemical examination of the gunpowder pattern around the bullet hole. **Four Items Must Be Submitted for Distance Determinations:**

The suspected firearm, the same/similar ammunition used in the shooting, a fired bullet, fired cartridge case, or fired shotshell, and the victim’s clothing with bullet hole (s). **Bullet passage determinations** can also be performed on other evidence items through visual

# CONT: FIREARM/TOOLMARK IDENTIFICATION

**Reminders: \*Please DO NOT SUBMIT LOADED AMMUNITION to the laboratory. We do not examine or test fire the evidence ammunition submitted in cases UNLESS the following examinations are requested: 1. Distance Determination 2. Ammunition Component Examination. If you mail loaded ammunition, Central Evidence Receiving (CER) will NOT mail your completed case back to you. You will have to come to the laboratory to pick it up.**

examination and chemical processing for gunshot residues.

6. **Ejection Pattern Determination:** Determine the possible locations of the shooter (s) based off of the locations of the fired cartridge cases at the scene.

7. **Serial Number Restoration:** Restore serial numbers or VIN numbers that have been obliterated.

8. **Bullet Trajectory/Shooting Scene Reconstruction:** Determine possible bullet paths; recover fired bullets and other firearm related evidence found in the vehicle.

9. **Toolmark Examination/Comparison:** Determine if the submitted tool (pry bar, bolt cutters, pliers, screwdriver, hatchet, tire iron, etc.) made the toolmark(s) on the piece of evidence in question (door, latch, lock, fence, safe, cable, etc.).

10. **Physical/Fracture Match:** Determine if two or more items were once a single piece, such as duct tape, frac-

tured metal, fractured glass, and fractured plastic (vehicle head lights, side-view mirrors).

11. **Footwear Examination/Comparison:** Determine if the submitted footwear made the questioned footwear impression(s). If only questioned footwear impressions are submitted, possible shoe make and model can be determined.

12. **Tire Track Examination/Comparison:** Determine if the submitted tire(s) made the questioned tire impression(s). *The entire vehicle (with tires still on) must be submitted to the laboratory in order to make known test standards of the suspected tires.* If only questioned tire impressions are submitted, possible tire make and model can be determined.

**Examiners in the Firearm/ Toolmark section examine a tire case with an overlay test impression.**



# FIREARM/TOOLMARK NOTICE:

**Return of Test Fires and Test Toolmarks** – As of February 1, 2013, test fired ammunition components and test toolmark standards have been treated as evidence, identified as sub-items of the evidence item that generated them, packaged in a separate envelope labeled “TEST SAMPLES”, and returned to the submitting agency with the originally submitted evidence. *It is the responsibility of the submitting agency to maintain these test samples and resubmit them if future comparisons are desired. If these test samples are lost or disposed of and the original firearm or tool is destroyed, future comparisons will not be possible.*



**A set of test fires from a 9mm firearm to be returned to the submitting agency.**

**Kent Cochran, section supervisor of the Firearm/ Toolmark Identification Section, test fires a pistol into the laboratory’s water tank.**

**The water tank is used to capture the test fired bullets so they can be used in the comparison process.**



# THE LATENT PRINT SECTION

## Stephen King Latent Print Section Supervisor

Latent prints developed at a crime scene or developed on evidence recovered from a crime scene remain among the most reliable forensic evidence attainable and this after

well over one hundred years of use. Why, after all this time, does latent print evidence still hold a central place in crime scene processing? Why has it not been replaced by something more modern, more reliable? The answers are both simple and complex. First, the simple:

latent print development remains vital to crime scene processing because even with technological advancements, any police officer, investigator, or technician can employ the techniques needed to make prints visible with very little training and at very little cost. A couple jars of dusting powder, a couple brushes, a roll or two of lifting tape, and a packet of background cards and you have a latent

***“fingerprints are both unique to an individual and, barring severe injury, will remain structurally the same over the course of the skin’s existence.”***

print field kit that will last an officer for the better part of a year, and all for less than a month’s-worth of Starbucks.

Now, the complex: for reasons even scientists cannot fully explain, fingerprints (and all of the rest of human

friction ridge skin on the body) are both unique to an individual and, barring severe injury, will remain structurally the same over the course of the skin’s existence. These dual, yet to be disproven, facts form the reliability that fingerprints continue to enjoy when it comes to hu-

man identification.

The Latent Print Section of the West Virginia State Police Forensic Laboratory can also provide reliability in offering support to any criminal investigation in which forensic latent print evidence has been collected from the state’s crime scenes. Whether an officer chooses to submit evidence for laboratory processing or submit the latent prints he or she developed at the scene for analyses, the Latent Print Section provides a full staff of four fully-trained latent print examiners employing a wide array of physical, chemical, and electronic processing techniques



A latent print examiner performs a comparison of fingerprints.

## CONT: LATENT PRINTS

to develop and preserve latent prints and the skill to analyze and compare complex latent prints that have been developed.

The Latent Print Section serves all law enforcement agencies within West Virginia – municipal, county, state, and federal. Over the last decade, the section has received and worked an average of 1,000 cases a year. Turnaround time for cases can vary widely depending on factors such as number of items of evidence, type of evidence, condition of evidence, number of non-latent tests requested (biological, drug identification, etc.), number and complexity of latent prints to be analyzed and compared, availability of known exemplars, and case priority. On average, however, a case can be worked and reported out within two to three weeks. The section ended 2014 with a statistically negligible backlog, the fourth consecutive year of doing so.

Among the numerous powders, chemicals, and viewing devices the section employs, arguably, the most important piece of equipment the examiners of the section have at their disposal is the Automated Fingerprint Identification System or AFIS. Since there is much confusion

in the law enforcement community on how AFIS technology works and what the results of an AFIS search mean, let's look closer at this aspect of latent print work.

First, AFIS is a rapid search system. The genius of the software lies in its ability to convert the individual biological characteristics of a finger or palm print into a mathematical algorithm that the computer can search through a database of known fingerprints and palm prints. These databases can have hundreds of millions to billions of individual impressions stored in them. Due to the rapid search capability of the AFIS software, however, an AFIS search often takes just a few minutes – a little longer through the federal database maintained by the FBI in Clarksburg, West Virginia, but rarely more than an hour or two. Second, though the “I” in AFIS is for identification, that is a bit of a misnomer: the computer does not make the identification. If a match is indicated, the actual identification is made by a qualified human examiner.



A forensic light source is used while looking for latent prints

## CONT: LATENT PRINTS

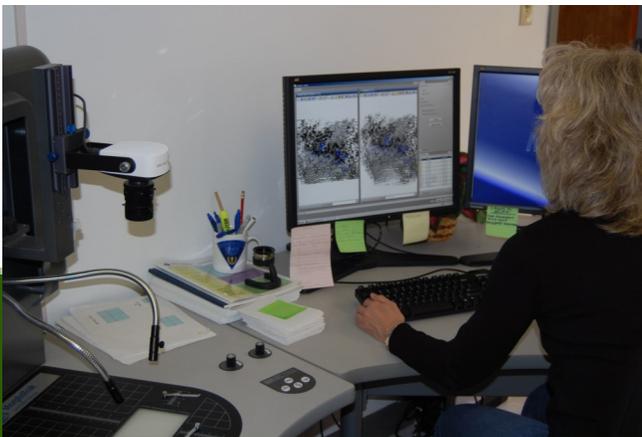
The computer provides a list of candidates arranged by the computer numerically from the most likely contributor of the latent to the least likely candidate among the group selected. Any match that the AFIS is indicating will be confirmed by a human examiner who will conduct a standard comparison of the latent print with a known print exemplar from the individual's Computerized Criminal History Information (CHRI) maintained locally by the West Virginia State Police's Criminal Identification Bureau Records Section (CIB Records). Again, CHRI is a bit of a misnomer. Not only does CIB Records maintain criminal histories, a substantial number of non-criminal fingerprint exemplars are housed in the database. These are individuals that needed background checks for employment or licensing. Some identification confirmations will be to individuals who were the victims of the crime being investigated or who had legitimate reason for being at the scene. However, most match confirmations will be

to individuals with criminal histories and who will now become persons of interest to police investigators.

Third, it is important to remember that AFIS is a computer, and like all computers, it has limitations.

Sometimes a negative result is legitimate and sometimes the computer will not find an individual who is actually in the database. How is that possible? There are many reasons why this can happen and when an investigator gets a negative AFIS report, he or she will also get the following caveat: "The negative results of the AFIS search may be an indication that the contributor of the latent fingerprint does not have known fingerprints in the database. Additionally, the AFIS may not have been able to make a match due to a lack of clarity caused by distortion in the latent fingerprint, the known database fingerprint, or both. Also the area of the finger that made the latent print may not have been recorded on the known fingerprint."

Lastly, as impressive as AFIS is at searching databases, it should be noted that all AFIS computers cannot communicate with each other. The West Virginia AFIS can launch searches of the federal database in Clarksburg, but it cannot do so with other state databases; nor can other state databases communicate with our database.



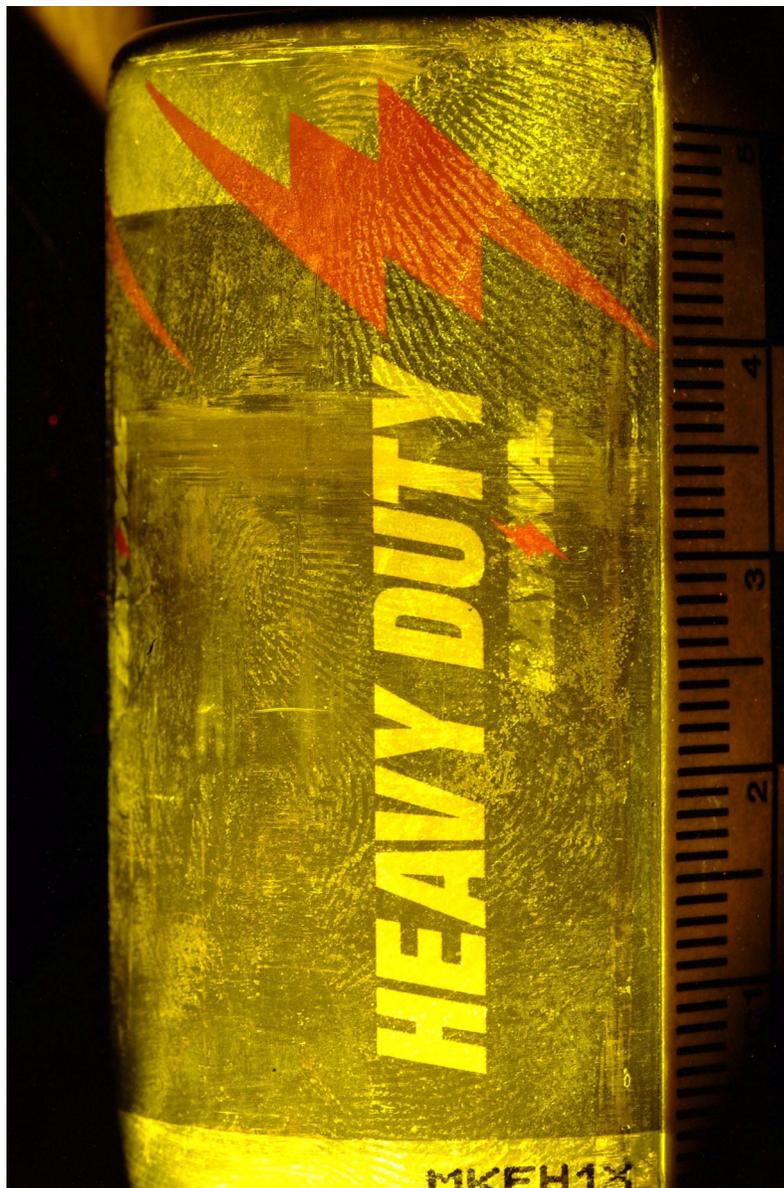
An AFIS workstation in the Latent Print Section

## CONT: LATENT PRINTS

Think of the FBI database as the hub of a spoked wheel.

The spokes are the states connected to the FBI, but not to each other. This lack of interconnectivity has been cited by a National Academy of Sciences report as a major problem that needs to be addressed by the vendors of the various AFIS computers, the FBI, and the individual states. We are still years away from a solution. As of now, AFIS searches will be conducted according to policies established by the FBI and the individual states. Please contact the Latent Print Section of the West Virginia State Police Forensic Laboratory to obtain information about the AFIS policies pertaining searching latent prints.

**“The West Virginia AFIS can launch searches of the federal database in Clarksburg, but it cannot do so with other state databases; nor can other state databases communicate with our database. “**



Latent prints developed on a battery

# QUESTIONED DOCUMENTS SECTION

**Staci Taylor**  
**Questioned Documents Section**  
**Forensic Analyst**

The Questioned Documents Section is responsible for the examination of checks, credit card receipts, demand notes, suicide notes, bomb threats, anonymous letters, firearm transaction reports, and any other document evidence related to criminal investigations. Documents submitted to the Questioned Documents Section are examined to determine if the document is genuine or counterfeit, to identify or eliminate persons as the source of handwriting, to expose alterations, obliterations, substitutions, or erasures within the document, to expose impressions on the document, and to determine the source of the document.

The majority (66%) of cases submitted to the Questioned Documents Section between October 2013 and October 2014 were for the examination of handwriting

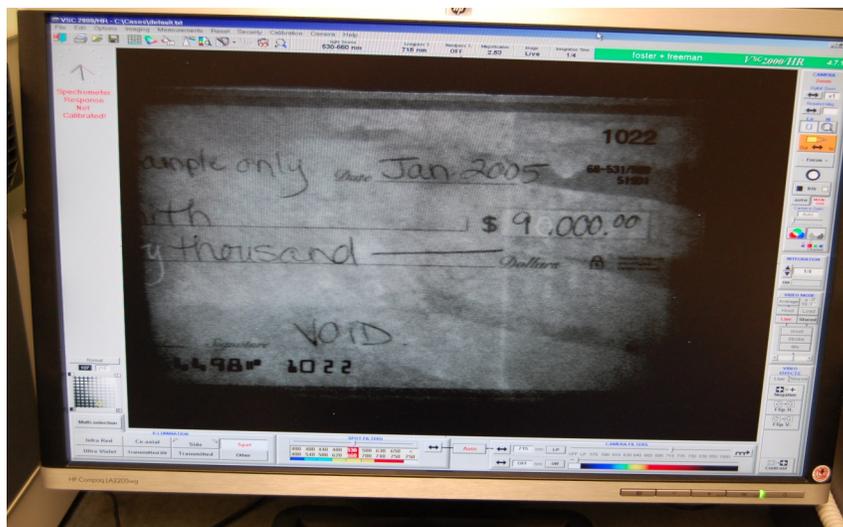
for suspected forgery or fraud cases. These cases included allegedly forged checks, allegedly forged insurance claims, and allegedly forged motor vehicle titles. Of the remaining thirty-four percent of cases submitted, twelve percent (12%) were alleged suicide notes, eight percent (8%) were bomb threats, eight percent (8%) were bank robbery or theft-related crimes, and six percent (6%) were drug-related crimes.

The examination of questioned documents can provide investigative leads and/or corroborative evidence for a variety of crime investigations such as contraband mailed into a jail, threatening letters, sales ledgers for drugs or stolen

goods, and homicide. A document may contain indented impressions from another sheet of paper that was written on while the two documents were stacked together. These indented impressions could reveal a name, address, phone number, or other information that may lead to the source of the letter. A torn or cut document can be physically matched back to its source if the suspected source is discovered during the investigation.

Handwriting on multiple documents can be examined to determine if one or more persons is the author of all of the documents. The handwriting can then be compared to that of any suspected persons.

**The Visual Spectral Comparator (VSC) can be used to expose items of evidence to different light sources.**



# TOXICOLOGY

## Erin Feazell Toxicology Section Supervisor

The Toxicology Section primarily performs alcohol and drug analysis on blood samples taken from subjects believed to be driving under the influence. Blood samples should be submitted using Biological Specimen Collection Kits provided to hospitals by the Commission on Drunk Driving Prevention (CDDP). IF A KIT IS NOT AVAILABLE, REQUEST THAT THE BLOOD SAMPLE BE DRAWN IN A GRAY TOP BLOOD COLLECTION TUBE. If the provided blood collection vials have expired, replace them with similar unexpired vials from the hospital stock (Gray Tubes). The section also performs alcohol and drug analysis on samples taken from victims of sexual assault. There is a Toxicology Kit contained inside of the Sexual Assault Collection Kits that contains the proper collection containers. The Toxicology Section will also analyze liquids in order to determine the alcohol content of “moonshine” liquors, wines and beers. This type of case should be hand delivered to the laboratory due to the possibility of being highly flammable.

### TIPS TO REMEMBER:

- Use **Gray Top Blood Tubes (lavender only if gray isn't available)**

- **Make sure tubes are filled at least half full during collection. Tubes filled less than half full may not be able to be analyzed.**
- **Request either Blood Alcohol (BAC) or Drug Testing or both on the Case Submission Form. Please don't just write Toxicology. If we don't know what type of analysis you want, more sample, time and resources are wasted on an analysis you might not need.**
- **If your PBT/Intoximeter reading is 0.000 please only request Drug Testing on the Case Submission Form.**
- **If you suspect someone of using an inhalant or “huffing,” please provide this information on the Case Submission Form.**  
**This analysis is performed during Blood Alcohol Testing. If you request Toxicology Drug Testing on these cases, the substance will be missed.**
- **Cases with a BAC of  $\geq 0.08\%$  Blood Alcohol by Weight will not be tested for drugs, unless there are extenuating circumstances.**
- **Alcohol content of liquids requires only 4oz. of liquid for analysis. Submit the sample in a sealed, leak proof container.**

**“Use Gray Top  
Blood Tubes  
(lavender only if  
gray isn't  
available)”**

# CONT: TOXICOLOGY



A Biological Specimens Kit (above) and Gray Top Blood Tubes (below)



- Sexual Assault cases — Please list the Toxicology Kit on your case submission form if you are submitting it, along with your testing requests.
- If your case has pled or been dismissed, please notify the laboratory either by calling 304-746-2288 or e-mailing [toxicology@wvsp.org](mailto:toxicology@wvsp.org)

are obtained from the hospital using the guidelines provided in TITLE 64, SERIES 10, METHODS AND STANDARDS FOR CHEMICAL TESTS FOR INTOXICATION which is set forth by the Bureau for Public Health.

Before performing the following calculations, one must:

- Ensure that the value was determined from Serum
- Ensure that the units of measurement are listed as mg/dL

## HOSPITAL ALCOHOL RESULT CONVERSIONS

Blood Alcohol results can be determined from Serum Alcohol results that

COMPREHENSIVE METABOLIC PROF					
GLUCOSE	125	H	70-110 mg/dL	ML	
BLOOD UREA NITROGEN	8		6-22 mg/dL	ML	
CREATININE	0.87		0.72-1.30 mg/dL	ML	
GFR ESTIMATED	> 60		>60 ml/min	ML	
SODIUM	135	L	136-145 mmol/L	ML	
POTASSIUM	3.5		3.5-5.0 mmol/L	ML	
CHLORIDE	99	L	101-111 mmol/L	ML	
CARBON DIOXIDE	22		22-32 mmol/L	ML	
CALCIUM	9.8		8.5-10.5 mg/dL	ML	
TOTAL PROTEIN	7.6		6.0-8.0 g/dL	ML	
ALBUMIN	4.4		3.2-5.0 g/dL	ML	
BILIRUBIN, TOTAL	0.5		0.0-1.3 mg/dL	ML	
AST	29		0-45 IU/L	ML	
ALT	23		0-63 IU/L	ML	
ALK PHOSPHATASE	72		35-120 IU/L	ML	
ALCOHOL SERUM	256	H	<10 mg/dL	ML	

ML -- CITY HOSPITAL 2500 HOSPITAL DRIVE  
MARTINSBURG, WV 25402

1. Take the value 256.0 and move the decimal point 3 places to the left (0.256) to convert the units from mg to g
2. Take this value of 0.256 and divide by a factor of 1.16 as prescribed in §64-10-8 section 8.2 (d)

$$0.256/1.16 = \underline{0.22} \% \text{ Blood Alcohol by Weight}$$

## CONT: TOXICOLOGY

The Toxicology Section is currently staffed by Supervisor Erin Fezell and trainees Tommy Buscher and Austi Roush. With the increase in officers taking the Advanced Roadside Impaired Driving Enforcement (ARIDE) training and certification of twelve new Drug Recognition Experts (DRE's) in December 2014, case submissions to the Toxicology Section are at an all-time high. The Toxicology Section has received almost 300 more cases in 2014 than it did in 2013. Blood Alcohol cases are grouped together and analysis is typically performed at the end of each month. Each case must then be reviewed by another analyst, which can sometimes take up to two months. Current turnaround time for Blood Alcohol ONLY cases is approximately three

months. Cases requiring drug testing have approximately a year turnaround time. Expedited requests for Drug Testing are extremely backed up and will require a minimum of 4-6 months to complete.

**Case Turn Around Time:**  
**Blood Alcohol Testing —**  
**Approximately 3 months**  
**Drug Testing —**  
**Approximately 6 months**  
**to 1 year**

to, alcohol. The International Association of Chiefs of Police (IACP) coordinates the International Drug Evaluation and Classification (DEC) Program with support from the National Highway Traffic Safety Administration (NHTSA) of the U.S. Department of Transportation. These officers are located throughout the state and can be a valuable resource for determining whether someone is driving impaired. If you are unaware of who is certified as a DRE in your area, please e-mail [toxicology@wvsp.gov](mailto:toxicology@wvsp.gov) and we will put you in contact with your closest DRE.

A Tidbit...

### WHAT IS A DRE?

A drug recognition expert or drug recognition evaluator (DRE) is a police officer trained to recognize

impairment in drivers under the influence of drugs other than, or in addition



**The MGC 240 Benchtop Analyzer used for drug screening**

# TRACE EVIDENCE SECTION

**Koren K. Powers**  
Trace Evidence Section Supervisor

The Trace Evidence Section of the laboratory is currently staffed with three full time analysts. The section currently performs analysis in the areas of gunshot primer residue (GSR), fire debris, glass, and paint. This section utilizes multiple types of instrumentation including Scanning Electron Microscopy, Gas Chromatography-Mass Spectrometry, and Infra-red Spectroscopy. In addition to these major sub-disciplines, the Trace Evidence Section may be able to perform some miscellaneous examinations, such as speed at time of im-

impact from speedometers and material identification.

Gunshot residue (GSR) is generated from the primer mixture of a cartridge

case and consists typically of lead, barium, and antimony. This residue may be deposited on a shooter's hands, face, or nearby surfaces, depending on the conditions at the time of firing. Gunshot residue kits are analyzed in the laboratory using a Scanning Electron Microscope equipped with an Energy Dispersive X-ray Detector (SEM-EDS). This allows gunshot residue to be identified based on the composition and morphology of the particles present on the samples submitted to the laboratory. Please note that gunshot primer residue is not used to perform distance determinations. Distance determinations are performed using powder residues not primer residues and are performed in the Firearm Section of the laboratory.

Debris collected from the scene of a fire may

be examined for ignitable liquids residues, such as gasoline or kerosene. Any debris collected must be packaged in an air tight container, preferably an unused metal paint can, to prevent evaporation or loss of any potential residues. Fire debris samples are analyzed in the laboratory using Gas Chromatography/Mass Spectrometry for the identification of any ignitable liquids residue present.

Paint evidence may be encountered in burglary, breaking and entering, and hit and run cases. Paint chips, fragments and smears may originate from protective and/or decorative coatings such as varnishes, lacquers, sealers, enamels and plastics. Comparison of the paint samples with respect to their color, texture, layer, structure,



Fire debris can be analyzed at the Forensic Laboratory.

*“Gunshot Residue (GSR) is generated from the primer mixture of a cartridge case...”*

Residues created during the firing process of a firearm.



# CONT: TRACE EVIDENCE SECTION



**Glass collected during a burglary.**

chemical solubilities, organic and inorganic compositions is attempted depending on the condition of the samples. These examinations may help determine whether or not paint samples could have originated from

the same source.

Glass fragments may also be encountered in many types of cases, including burglary and hit and run cases. Glass

is impervious to chemical attack and may remain on items for long periods of time.

Glass fragments may be recovered from clothing, shoes, tools, etc. Glass fragments recovered from these items may be compared to glass from known sources. Exami-

nation and comparison of known glass with questioned samples may disclose that they are alike or different with respect to their physical, optical and chemical properties.

If an examination not listed under these major Trace Evidence sub-disciplines is desired, please contact the laboratory for more information and for specific instructions on collection, packaging, and submission procedures.

## TELL US HOW WE'RE DOING

The West Virginia State Police Forensic Laboratory has a feedback form that can be filled out by anyone who has submitted a case and received results.

- If you want to complete a feedback survey please contact the laboratory at 304-746-2488 and one can be sent to you by mail or email.

### WEST VIRGINIA STATE POLICE FORENSIC LABORATORY FEEDBACK SURVEYS



The West Virginia State Police Forensic Laboratory strives to achieve excellence in service through open communication and cooperation with the agencies we serve. Please assist us in achieving this goal by completing this evaluation.

**Please check the services that have been provided to you:**

- Central Evidence Processing (Body Fluid and Hair ID)     Biochemistry (DNA Analysis)
- Trace Evidence (Glass, Paint, Gunshot Residue or Fire Debris)
- Firearm and Toolmark (including Footwear and Tire Impression)     Questioned Documents
- Toxicology     Drug Identification     Latent Prints

**Please circle responses on a scale from 1 to 5; 1 = very dissatisfied 5 = very satisfied:**

- Were responses to inquiries provided in a timely manner?  
1    2    3    4    5
- Did the Laboratory Staff treat you in a professional manner?  
1    2    3    4    5
- Did the service meet your needs?  
1    2    3    4    5
- Overall, how satisfied are you with the services provided by this laboratory?  
1    2    3    4    5

Comments/Suggestions for improvement:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Phone #: \_\_\_\_\_ Email: \_\_\_\_\_  
Title: \_\_\_\_\_ Agency: \_\_\_\_\_ Date: \_\_\_\_\_

**Please return by US mail, fax or email to:**  
WVSP Forensic Laboratory  
725 Jefferson Road  
South Charleston, WV 25309  
Fax: (304) 746-2427  
Lab.director@wvsp.gov (Laboratory Director)

**Thank you for your assistance!**

## CONTACT US

West Virginia State Police  
Forensic Laboratory  
725 Jefferson Road  
South Charleston, WV 25309  
Phone: 304-746-2488  
Fax: 304-746-2427  
E-mail: [lab.director@wvsp.gov](mailto:lab.director@wvsp.gov)

### Section Contacts:

**Biochemistry:** [biochemistry@wvsp.gov](mailto:biochemistry@wvsp.gov)  
**Central Evidence Processing:** [cep@wvsp.gov](mailto:cep@wvsp.gov)  
**Central Evidence Receiving:** [cer@wvsp.gov](mailto:cer@wvsp.gov)  
**Drug Identification:** [drugs@wvsp.gov](mailto:drugs@wvsp.gov)  
**Firearms/Toolmarks:** [firearms@wvsp.gov](mailto:firearms@wvsp.gov)  
**Latent Prints:** [latent.prints@wvsp.gov](mailto:latent.prints@wvsp.gov)  
**Questioned Documents:** [documents@wvsp.gov](mailto:documents@wvsp.gov)  
**Toxicology:** [toxicology@wvsp.gov](mailto:toxicology@wvsp.gov)  
**Trace Evidence:** [trace@wvsp.gov](mailto:trace@wvsp.gov)

## FEEDBACK

We are welcoming feedback for the upcoming newsletter!

Have comments or suggestion?

Want to know how we do something?

Need to know how we recommend to collect a specific type of evidence?

Feel free to contact the editors and suggest topics and provide us with any comments or feedback.

Your Editors,

Blake N. Reta — [blake.n.reta@wvsp.gov](mailto:blake.n.reta@wvsp.gov)  
Stephen C. King — [stephen.c.king@wvsp.gov](mailto:stephen.c.king@wvsp.gov)

## Laboratory Mission and Goal

### Mission:

It is the mission of the West Virginia State Police Forensic Laboratory to provide accurate and impartial scientific support services to all criminal justice agencies operating in the State of West Virginia.

### Goal:

The goal of the West Virginia State Police Forensic Laboratory is to generate accurate, impartial, and timely scientific examinations and opinions for the criminal justice system of the State in the interest of public safety. Establish and maintain a database of convicted felons, sex offenders, case work profiles, and mission persons.



## By the Numbers

The West Virginia State Police Forensic Laboratory has **8** sections and is the only full service laboratory in the state of West Virginia.

The Forensic Laboratory services more than **800** city, county, state, and federal agencies.

At full capacity the Forensic Laboratory employs **48** staff, including **41** scientists.

Average cases received annually: **6,385**

Cost to operate the Forensic Laboratory in 2014: **\$4.47 million**